

Petrographic characterization of samples No.1-No. 5

Techniques: Reflected light microscopy (Zeiss Photoscope microscope) and oil immersion was used to qualitatively characterize the samples. Samples were mounted in epoxy and prepared using the standard preparation technique for the reflected light.

Results: All the samples contained anthropogenic organic matter, but the contribution of these particles to the total sample varied. Samples #1 and 3 contained abundant anthropogenic particles, and they included coal fragments (Fig.3D), isotropic and anisotropic char (Fig. 1A,B, Fig. 3C), coke (Fig. 1C), and inorganic components such as spinel (Fig. 1D, 3B) and glass (Fig. 3A).

Samples #2, #3, and #4 have less anthropogenic particles, with the dominant contribution from the Illinois Basin coal (Fig. 2B,C, 4A). Other types of anthropogenic particles include isotropic char (Fig. 3C, spinel (Fig. 3B, 4B), and glass (Fig. 3A).

Interpretation: The samples analyzed contain anthropogenic particles resulting from coal utilization. The content of these particles in the samples vary from about 1% percent in sample #4 to probably more than 20% in sample #3.

The type of anthropogenic particles suggests that they come mainly from coal combustion (e.g., glass cenospheres, spinel, isotropic char, all possible components of fly ash). Some particles have well developed anisotropic(coke-type) texture, and may come either from coke plants or coal-fired power plants.